Public Health in Veterinary Medicine

Topics of public health importance were presented frequently throughout the program of the eighty-ninth annual meeting of the American Veterinary Medical Association, Atlantic City, June 23–26, 1952. The program reflected the increasing importance of the control of diseases of animals as they affect the health of man. Public Health Reports briefs several of the papers which had more than usual public health significance. This briefing was made possible by the cooperation of Dr. J. G. Hardenburg, executive secretary of the American Veterinary Medical Association, and with the assistance of the authors—upon whose authority the material is presented.

Leptospirosis In Farm Animals

Leptospirosis, an infectious and contagious disease, may affect many species of domestic animals. First recognized in cattle in this country in 1944, evidence indicates that it has occurred endemically in Pennsylvania since 1945. Isolation of *Leptospira* in an outbreak of disease in swine was reported in 1952, and signs of the disease have also been observed in horses.

Symptoms and Signs

In bovine leptospirosis, fever, marked and sudden reduction in milk flow, and changes in the udder and in the quality of milk are noticeable symptoms. In some cases, the fever may be of short duration; in others, persistent. The udder is limp and empty and shows no inflammatory changes, distinguishing it from mastitis. The milk produced is thick, viscid, and yellowish. In mild cases, fever and sudden drop in milk flow for a day or two may be the only detectable evidence of the disease.

In severe cases, pink milk, purple or port-wine colored urine, and jaundice appear about the third to fifth day. The pink milk and purple urine denote the presence of hemoglobin, which is excreted as a result of excessive hemolysis. The purple urine helps differentiate leptospirosis from pyelonephritis, in which the urine is reddish from the presence of free blood. Anemia, which results from the breakdown of the red blood cells, aggravates the labored respiration and weakness already produced by the infection. Leptospiral organisms may be found in the urine about the time jaundice appears, if not earlier.

Occasionally, exceptionally severe cases of leptospirosis in cattle are fatal within 2 or 3

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days, hemoglobinuria and jaundice not appearing at all or only terminally. In the average outbreak, however, the course of the disease extends from 3 to 10 days.

Diagnosis

In outbreaks of leptospirosis involving several cattle, evaluation of the history and symptoms should lead to a diagnosis. Diagnosis may be confirmed by recovery of the organism from the urine; inoculation of laboratory animals or cattle with urine, milk, or blood from clinical cases; or serologic tests after the outbreak has subsided.

Autopsy

In fatal cases, the tissues are icteric, and petechiae are commonly found on the pericardium and often on the liver. In some instances the liver shows centrilobular necrosis. The surface of the kidney should be studied for the presence of small, darkly pigmented spots, although small white spots diffused over the surface of the kidneys have been found in experimentally infected calves. The kidney tubules are usually the site of injury. They may be blocked by protein precipitates.

Treatment

In addition to general nursing care, adequate fluid should be provided to maintain good urine flow. The use of sulfonamides is very questionable, but penicillin medication appears to shorten the course of the disease. Aureomycin has been shown to have definite protective value for hamsters and dogs against some strains of *Leptospira*. At present, however, none of the antibiotics can be considered specific.

Definitely beneficial, in our opinion, are blood transfusions. If available, blood from recovered animals should be used since antibodies probably remain in the blood for some time after recovery. Blood from normal animals, however, will supply the needed red blood cells and plasma proteins.

Spread and Control

Evidence indicates that bovine leptospirosis spreads directly from animal to animal in the herd. When cattle urinate, the spray of droplets may well carry the organism present in the urine of infected animals to susceptible animals. Any minute skin abrasion can afford a means of entry. Chronic carriers may be the means of spread from one herd to another.

Leptospirosis of domestic animals is not only a disease of economic importance in livestock, but should be regarded as of considerable significance as a public health problem. Infected animals should be quarantined and their milk sterilized before being discarded. Contamination of other animals and of equipment by urine should be avoided. Although the strains isolated from cattle in the United States have not yet been shown to be agents of human disease, types found in other countries have been clearly demonstrated to be pathogenic for man. These types may appear in this country at any time.

North American Leptospirae

PHR brief

The significance of leptospiral infections in man and domestic animals in North America is being increasingly recognized. What were but a few years ago considered exotic infections are today significant problems to human and animal health.

In the leptospiroses, as in other infectious diseases, laboratory diagnosis, prophylactic and control measures, and the development of immunizing and therapeutic agents are dependent upon the characteristics of the organisms themselves, their hosts and reservoirs, and the means of transmission of infection. The identification of infecting strains may, in addition to the clinical and epidemiological value, be of forensic importance in cases of occupational disease.

In our laboratories, the eight known antigenically different types of leptospirae in North America were classified by comparison with

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North American leptospirae

Antigenic group	Hosts	Transmission to man
Leptospira bataviae	Mongooses, rats, mice	Contaminated water.
Leptospira pomona	Cattle, swine, horses (serologic)	Contaminated water. Contact with infected animals.
Leptospira autumnalis	Unknown	Unknown.
Leptospira ballum	Rats, mice	Contaminated water.
Leptospira canicola	Dogs	Contact with infected animals.
Leptospira icterohemorrhagiae	Dogs, mongooses, rats, mice	Contact with infected animals. Contaminated water. Contaminated working areas.
Leptospira pyrogenes	Rats, mice	Contaminated water.
Leptospira hebdomidis	Mice	Contaminated water.

known type strains. First, the cross agglutination-lysis patterns were established for the type strains available. This permitted the selection of antiserums prepared against a limited number of leptospiral strains to be employed as a rapid screen in preliminary typing of leptospiral isolates. The preliminary typing was followed by comparison of the unknown with all members of the broad group whose antiserums reacted with it. Definitive identification was often accomplished only by agglutination absorption after this second cross agglutination-lysis examination.

Cross complement fixation studies employing the sonic-vibrated and the egg-propagated complement-fixing antigens demonstrated no significant difference in sensitivity or antigenic spectrums between these two antigens. Both are extremely valuable in establishing leptospirosis per se, but the broadness of their antigenic spectrums mitigates against their use in the classification of leptospiral strains, thus precluding their use in epidemiological surveys.

Cross complement fixation studies employing soluble antigens have demonstrated these antigens to be highly strain specific. Comparative typing of more than 100 cultures by agglutination-lysis and by cross complement fixation employing soluble antigens reveals the latter technique to be as reliable as the former, with the added advantages of greater ease and rapidity and the elimination of the hazard incident to the use of living antigens.

Basis for Preventive Measures

Although classification of leptospirae must ultimately rest upon their antigenic characteristics, each identification should be used in connection with known or reported hosts for these strains and with information of occupational or other hazards of infection as the basis for preventive public health measures.

The accompanying table lists the known hosts of North American leptospirae and the most common means of transmission of infection to man. Two strains, *Leptospira icterohemorrhagiae* and *Leptospira canicola*, are harbored by the dog, thus providing an occupational hazard to veterinarians and kennelmen.

Leptospira pomona has been found to date only in the large domestic animals and man; consequently, prevention of spread of this infection is primarily a livestock problem. Control of the other leptospiroses must rest upon rodent and small carnivore control and improved sanitation.

Foot-and-Mouth Disease In Saskatchewan

PHR brief

At the present, only the United States, Australia, New Zealand, Ireland, and, we now believe, Canada can be classed as free from foot-and-mouth disease, which reached pandemic proportions in most European countries last year.

The cause is a virus, of which there are known to be six distinct immunologic types—A, O, C,

By T. Childs, D.V.M., veterinary director general, Health and Animals Division, Dominion Department of Agriculture, Ottawa, Canada.

and three recently identified African types. There are variants within types. Type A was responsible for the 1951 outbreak in Canada.

Radical control and eradication measures are mandatory in Canada. Herds and premises suspected of infection are placed under close quarantine. The animals involved are disposed of by slaughter and deep burial, and the premises are cleansed and disinfected, remaining under close quarantine for 30 days or more. Then, test animals are installed under quarantine and observation until we are satisfied the premises are free of infection.

Foot-and-mouth disease appears to have been implanted either innocently or maliciously by an immigrant from a farm in Western Germany during his employment as a dairy helper in November 1951 on the L. T. Wass premises 34 miles northeast of Regina, Saskatchewan.

The condition was not correctly diagnosed until February 19, 1952, largely owing to the apparently mild nature of the disease, the negative results of horse inoculations, and the preposterousness of thinking the disease would be found in that location. Quarantine imposed on individual premises upon discovery of the disease was apparently very effective in preventing greater spread, hence, the economic results were not greatly altered by the late diagnosis.

Although we are convinced that foot-and-mouth disease has been decisively defeated in Canada, we have no intention of relaxing vigilance. Our veterinarians have examined about 2 million cattle, swine, and sheep since February 18, 1952, with negative results to tests. The number of animals destroyed because of infection, exposure, or suspected exposure is 1,343 cattle, 97 sheep, 1 goat, 290 swine, and 2,142 poultry. Twenty-nine of the 42 premises involved were classed as infected, and 13 were classed as exposed.

To prevent a recurrence, we now require that all immigrants from countries where foot-and-mouth disease is prevalent produce a satisfactory certificate of disinfection for their clothing and personal effects before receiving visas to immigrate. Also, all parcels from such countries are closely examined by our postal and express officials; and if there appears to be doubt about their contents, particularly if addressed to a farm worker, the parcels are held for examination by a government veterinarian. We require all railroad stock cars and livestock-carrying trucks to be cleansed and disinfected after unloading livestock. Since April 1, 1952, all public and packing plant stockyards and feed lots throughout Canada have been thoroughly cleansed and disinfected under governmental supervision.

Infectious Canine Hepatitis

—A Symposium—

PHR brief

Infectious canine hepatitis is widespread and has a high rate of incidence in the dog population. Only in recent years, however, has it been recognized as one of the most serious infectious diseases of small animals. Knowledge has rapidly followed the proof of the existence of infectious canine hepatitis (1947) as a definite clinical entity caused by a specific virus. The probable natural route of the infection has been established, the source of the virus for spread determined, further information of its disease potential accumulated, and a rational immunization procedure evolved.

By J. A. Baker, D.V.M., Ph.D., director, J. H. Gillespie, D.V.M., associate professor of bacteriology, and G. C. Poppensiek, D.V.M., research associate, Veterinary Virus Research Institute, Cornell University, Ithaca, N. Y.; H. D. Stephenson, D.V.M., professor of therapeutics and small animal diseases, New York State Veterinary College, Ithaca, N. Y.; W. H. Riser, D.V.M., practitioner, Skokie, Ill.; and J. H. Mark, D.V.M., associate professor of medicine, School of Veterinary Medicine, University of Pennsylvania, Philadelphia. Dr. Baker acted as moderator; Dr. Gillespie discussed the clinical aspects of the disease; Dr. Riser, pathology; Dr. Mark, epizootiology; Dr. Poppensiek, immunology; and Dr. Stephenson summarized the papers.

Clinical Features

Clinical observation and experimental findings have indicated a difference in severity of the illness in individual dogs studied—from a slight fever in some dogs to a moderate or severe reaction terminated in some cases by death. As shown by complement fixation tests, an average of 50 percent of dogs have had hepatitis. Bruner and co-workers have indicated that 12 percent of naturally infected dogs died. Percentages are on the basis of incidence determined by complement fixation test in relation to autopsy findings. About the same percent have died from the disease experimentally induced.

Clinically it is difficult to differentiate infectious canine hepatitis from distemper in the acute stage. High "saddle" temperatures, leukopenia, malaise, conjunctivitis, lack of appetite, tonsillitis, and extreme thirst with vomiting, diarrhea, jaundice, and difficulty in breathing characterize the disease. All symptoms may not appear in any one case. Corneal opacity develops in 25 percent of convalescent dogs. This cloudiness may involve one or both eyes for varying periods and then disappear completely. A few dogs with spontaneous illness show cerebral symptoms. No nervous symptoms have been reported in dogs with experimental hepatitis.

Simultaneous infection of dogs with the virus of infectious canine hepatitis and with distemper produce an illness more severe than either virus alone. Dogs that have been inoculated with distemper virus and then been given infectious hepatitis virus afterward show illness in severity comparable to simultaneous infection. Dogs that recovered from hepatitis first did not show this conditioning effect with later infection by distemper virus.

Pathology

Four clinical forms of infectious canine hepatitis are postulated based on the classification of Parry and Larin: (*a*) fatal, fulminating form; (*b*) severe, nonfatal form; (*c*) mild form; (*d*) inapparent form. Pathology as described here applies primarily to the symptoms and lesions found in the fatal, fulminating form.

The virus is selective in the tissues it attacks. The primary destructive changes occur in the blood vessels and the hepatic cells. The clotting time of the blood is markedly decreased. Such lesions as intraocular hemorrhage, bleeding in the oral cavity, hemoperitoneum, paintbrush ecchomycosis of the gastric serosa, and hemorrhagic lymph nodes are produced. The liver appears normal in size but is usually discolored. Many of the hepatic nuclei contain inclusions. The gall bladder wall swells and thickens. The blood clots with difficulty. Positive diagnosis can be made only by histological study of sections from the liver tissues.

Epizootiology

The epizootiological features of infectious canine hepatitis present marked differences from other infections commonly met in small animal practice. The virus is not an airborne one. It can be spread by direct contact, ingestion of saliva from infected dogs, parenteral injection, and by infected urine from dogs that have recovered from the disease. A matter of 6 inches between susceptible dogs and infected dogs is, however, an effective barrier to the transmission of the virus.

As early as 1937 experimental transmission of a presumed type of distemper was recorded in the United States. The description of the original case and the histopathology of the infected animals show remarkable similarity to the present concept of infectious canine hepatitis. That the epizootic fox encephalitis and the virus of infectious canine hepatitis were one and the same was confirmed in 1947.

The virus disappears from the blood at the end of the fever and leukopenia but has been recovered from the urine from 3 days to at least 6 months after inoculation or production of the disease. Evidence points to the fact that the elimination of the virus is through the kidney. Every precaution should be taken to prevent the spread of this disease, which seems to be on the increase.

Immunization

Since simultaneous infection with the virus of distemper and the virus of infectious hepatitis is frequently fatal, the need for immunization is apparent.

Antiserum confers passive immunity, and passive immunity is of short duration. Vaccination with inactive viruses must be repeated at approximately yearly intervals if serviceable immunity is to be maintained. Inoculation of a strain of virus that has been attenuated by adaptation to another host has not been done as yet with infectious canine hepatitis virus. Live virus vaccines have been found to produce a dependable immunity of long duration.

A study was made at the Cornell Research Laboratory for Diseases of Dogs to evolve a means of immunization by the use of both serum and virus to attempt immunization against distemper and infectious canine hepatitis at the same time, by incorporating distemper virus that had been grown in eggs. The results promise to provide immediate protection of long duration for dogs against both diseases.

Anthrax in Ohio Swine

PHR brief

"Regulation 13—Relating to Anthrax Control," in Ohio became effective June 12, 1952. The most severe anthrax outbreak on record in the State occurred in 1952. In the sporadic outbreaks of 1916, 1923, and 1951 only one or two farms had been involved. But in 1952 the anthrax outbreak involved swine in counties all over the State. Answers to questionnaires established the fact that imported raw bone meal used as feedstuff contained anthrax spores and had caused the 1952 outbreak.

During an isolated anthrax outbreak in 1951 in Preble County, 24 sows, 163 pigs, and 2 boars were found with the disease. In 3 days, 63 baby pigs died. Edematous pharyngeal swelling, temperatures of 105° to 107° F., and progressive dyspnea and deaths from strangulation were the symptoms. Only one sow showed pharyngeal swelling with a temperature of 105° F. Necropsy showed the lymph glands hemorrhagic and typical of septicemic disease.

By H. G. Geyer, D.V.M., chief, Ohio Division of Animal Industry, Columbus, Ohio

The submaxillary lymph glands revealed the typical textbook description of anthrax. The tonsillar area showed necrotic ulcerations, and, in those in which death had been due to strangulation, there was consolidation of the apical lobes of the lungs. Ecchymatic hemorrhages were found on the kidney surface, as well as petichial hemorrhages on the serosa of the urinary bladder. A slaughter-indemnity program was set up by the State division of animal industry to control this fast acting septicemic-like type of anthrax.

1952 Outbreak Differs

The 1952 anthrax outbreak was quite different from the one in 1951. The initial investigation in Clinton County in February found two brood sows dead. Ten other sows had been off their feed, constipated, had subnormal temperatures, and were developing edematous pharyngeal swellings. More cases with identical symptoms developed within a few days in the county.

By mid-April the anthrax had attacked swine in 52 counties on 264 farms but with a loss of only 384 hogs. Only one animal was infected on many of the farms. There was no evidence of spreading of the disease from animal to animal or from species to species.

Vomiting, which developed to a severity of whole blood in the vomitus, was a symptom in 12 sows. Four of these had typical pharyngeal swellings and temperatures of 104° to 106° F Two of the four died. Some boars, fat hogs, and suckling pigs were infected. In a herd of 256 hogs confined in a close building, 75 to 80 showed discomfort by almost constantly rubbing and kicking at their jowls. Marked conjunctivitis was also observed.

Quarantine Program Effective

The slaughter-indemnity program was not applicable in this situation because of the pattern of the disease nor was it economically practical because of the large population of swine in the State. A quarantine program was instituted, and quarantines were lifted at the end of 21 days if the animals showed no clinical symptoms of anthrax.

Penicillin administered early gave spontaneous response and antianthrax serums yielded good results. The quarantine program appeared adequate as a control measure, and the prompt reporting by veterinarians added to its success.

To control anthrax, it is recommended that sick animals be promptly reported, immediate quarantines be issued, and that dead animals be disposed of by deep burial or by burning. Contaminated pastures should not be used for a 4-year period. Hog lots, pens, and houses should be thoroughly cleaned, and manure and bedding burned. A 5-percent solution of lye is recommended for disinfecting.

Only fresh specimens should be submitted for laboratory examination: submaxillary lymph glands only from swine, and from cattle a portion of the ear or blood samples.

Role of Swine Diseases In Diseases of Man

PHR brief

Swine diseases play a minor role in unfavorably influencing human health, and the only human pathogen which seems to have a deleterious effect on swine is the influenza virus.

The relationship between diseases in swine and disease in man is usually considered a rather direct one, having to do with the spread of disease from swine to man by direct contact, by intermediate vectors, or by the ingestion of meat. However, a serious uncontrolled epizootic of a disease such as hog cholera in the swine population would have considerable effect on the food supply of the entire Nation.

Swine Diseases

The diseases of swine which have a direct relationship to disease in man are: trichinosis, taeniasis, balantidiosis, brucellosis, salmonellosis, anthrax, and erysipeloid.

By Richard E. Shope, M.D., formerly associate director of the Merck Institute for Therapeutic Research, Rahway, N. J., now with the Rockefeller Institute for Medical Research, New York, N. Y.

Trichinosis is a preventable disease, usually acquired by eating uncooked or unfrozen trichinous pork, and is one of the major hazards to human health presented by swine.

Man is actually the definitive host of *Taenia solium*, although the cycle involves both pig and man and can be broken in either the intermediate or definitive host. Man acquires his tapeworm by ingesting inadequately cooked pork containing *Cysticercus cellulosae*, and in turn serves as the source from which swine acquire their infection.

Balantidium coli, the one swine protozoa of importance to man, is a normal inhabitant of the swine gastrointestinal tract and is apparently completely innocuous to the pig, but, transferred to the human gastrointestinal tract, it causes clinical illness and sometimes a moderate secondary anemia. However, the infection rarely fulminates and causes death.

Probably the most serious of the four bacterial infections of swine that are medically important to human beings is that caused by *Brucella suis*. This infection may produce a debilitating febrile illness in man that may permanently incapacitate or even kill him. The swine *Brucella* can and does infect cattle and may thus infect man through contaminated milk. *Br. suis* infection in human beings is primarily an occupational disease which will not be eliminated until the reservoir of infection in swine is eradicated.

All species of *Salmonella* found in swine are potential human pathogens. *Salmonella choleraesuis* causes a septicemic type of infection, similar to typhoid fever, with leukopenia and fever, and with complications such as purulent meningitis, bacterial endocarditis, pyelonephritis, empyema, and abscesses in various parts of the body. Any poorly cooked pork that has been improperly handled during slaughter or processing is a possible source of danger.

Swine anthrax is dangerous to the farmer or veterinarian handling or autopsying the infected animal. The anthrax bacillus has also caused fatal infections in man when ingested in inadequately cooked pork. However, by ordinary care, it should be possible to keep human exposure to infection to a minimum.

Infections caused by the swine erysipelas organism, *Erysipelothrix rhusiopathiae*, result in acute dermatitis with marked erythema on the hands and wrists. The condition is not common even in butchers, meat handlers, and veterinarians, the occupational groups most frequently exposed to infection.

Epidemiology of Rabies

PHR brief

A disease of animals and man that resembled rabies was described in 3000 B. C., and about 500 B. C., the first adequate description of the disease was recorded. Pasteur's studies in the nineteenth century influenced the thinking of the world on rabies, but diagnosis was not established on a sound basis until 1903, when Negri discovered in the motor cells of the central nervous system the intracytoplasmic inclusion body which bears his name and which is considered as pathognomonic of the disease.

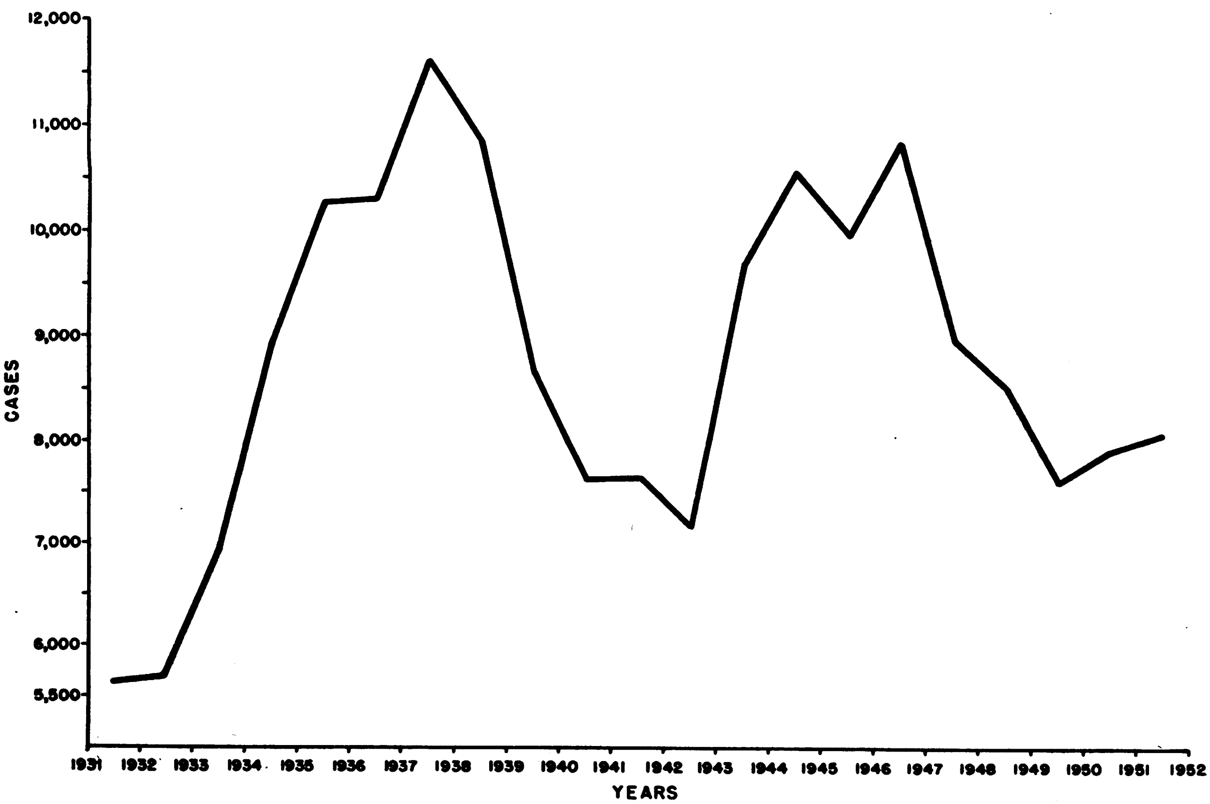
The etiological agent of rabies is a filterable, submicroscopic virus which varies in virulence and in immunogenic capacity. Rabies is usually transmitted through the bite of a rabid animal, and pathogenesis is believed to be neurogenic. The incubation period may vary from a few days to 6 to 9 months.

The vampire bat is the only known carrier of rabies. All attempts to demonstrate the carrier state or to create a carrier state experimentally in other animals have failed thus far.

With the exception of Australia, New Zealand, and Hawaii, which have never had rabies and where strict quarantine regulations are enforced, rabies is found in all climates and in all types of ecologic communities of warm-blooded animals. In the United States, rabies may occur at any time of year.

By Raymond Fagan D.V.M., M.P.H., veterinary epidemiologist, Kansas City field station of the Public Health Service Communicable Disease Center.

RABIES IN UNITED STATES—ALL SPECIES



Immunization undertaken approximately 30 days prior to exposures will usually induce resistance lasting one year, and perhaps as long as two or more years, but there is no reliable evidence that vaccine given after exposure to virulent rabies can protect against a clinical attack of the disease. However, evidence is accumulating that hyperimmune antirabies serum given after an exposure will so alter circumstances that vaccine can be used with efficacy.

Within specific areas rabies incidence shows definite peaks and valleys, but as yet no analysis has been made of the the factors which contribute to the dynamics of these epidemic curves.

Rabies Control

Two procedures are available to control rabies: prevention of contact between infected animals and susceptible animals, and reduction of the number of susceptible animals within an area. Leash laws, which, if enforced, prevent contact between infected animals and susceptible animals and man, have been virtually abandoned in the United States, leaving only the second method of control—reducing the density of susceptible individuals.

With some species of wildlife, attempts at control of numbers have succeeded in stabilizing the population. However, mere increase in numbers of animals, even when the rabies virus is present, does not mean an epizootic of rabies. Although epizootics and large wild animal populations seem to be associated, sporadic outbreaks do not justify extensive control operations.

In cities, control measures consist of enforcing leash laws and picking up stray dogs and/or vaccinating pet animals on either a voluntary or compulsory basis.

In controlling rabies in both wildlife and domestic animals, one type of program may be successful in one area and not in another.

Some veterinary administrators advocate that all clinical cases of rabies seen by veterinary practitioners be reported to a collecting agency. However, the present practice of having the diagnostic laboratory work on individual cases and report positive findings seems to be completely adequate.

Will Vaccination of Dogs Control Rabies?

PHR brief

In 1946, when I started working for the New York State Health Department, we tried to get dogs vaccinated wherever the rabies problem existed. In the central section of the State, we succeeded in getting 70 percent of the dog owners to comply. With rabid foxes biting and infecting cows and other animals, we knew that rabies continued in the district. Eighty-two rabid dogs were reported. Ten were "strays," and we didn't know if they had been vaccinated. Only 2 of the remaining 72 had been, showing that the vaccine must have been effective.

We do know that vaccine doesn't protect every dog. There are differences in dogs—some just don't produce protective substances in their bodies.

The individual wants to protect his pet. With vaccination, the chances of infection are nine to one against infection. The purpose behind compulsory vaccination laws is to get large numbers of people to vaccinate their pets.

Vaccination should be sold on its merits. There is no State in which the rabies problem is found throughout the entire State at any one time. I prefer to expend energy in getting dogs vaccinated where there is a rabies problem. Effort is wasted and limited, in my opinion when compulsory vaccination laws require it to be diffused over areas where the problem exists as well as where it doesn't.

If the disease is confined to dogs, as it is in large urban areas, rabies can be controlled in 6 months or less by "dog control"—where the owner keeps his pet leashed—by vaccinating 70 percent or more of the dogs, or by a combination of both measures. But we can vaccinate dogs until the cows come home, and the problem will still exist because we can't vaccinate or control the movements of foxes. Rabies is spread from one animal to another in the same way a baton

By Alexander Zeissig, D.V.M., formerly communicable disease veterinary consultant, New York State Department of Health, Albany.

is passed from one runner to another in a relay race—it doesn't spend any time whatever outside the animal body. If we remove 7 of every 10 foxes in an area by systematic trapping, we obtain the same result as by vaccinating 70 percent of the dogs. Such a systematic reduction of the numbers of wildlife has proved effective in New York State and elsewhere.

Salmonella Infections In Chickens and Turkeys

The poultry industry is still plagued by the economic loss caused by one or more of the salmonellas. Probably because of their insidious nature, the relative importance of pullorum disease, fowl typhoid, and paratyphoid infections is frequently underestimated.

Pullorum Disease

In the control of pullorum disease, we are intimately concerned with a cycle of infection in which the mature carrier is the important link. Early in its history, the desirability of combating pullorum on an organized basis was recognized. By 1921, Connecticut, New Hampshire, Massachusetts, and Maine had set up voluntary control programs, the basic features of which were the testing and retesting of breeding flocks, removal of reactors from the farm, clean-up and disinfection of premises, and purchase of replacement stock from clean sources. The National Poultry Improvement Plan, initiated in 1935, included a program of pullorum control, and in 1943 a similar nation-wide control program was extended to turkey flocks. The working basis of the national plan is cooperation under a memorandum of understanding between the several States and the United States Bureau of Animal Industry, and voluntary participation under appropriate agreements between hatcheries and flock owners and an official State agency.

By L. C. Heemstra, D.V.M., veterinary coordinator, national poultry and turkey improvement plans, Bureau of Animal Industry, U. S. Department of Agriculture, Beltsville, Md.

All States with the exception of Nevada have signed memorandums of understanding with the bureau. The work at State levels embraces 4,389 chicken and 895 turkey hatcheries, nearly 37 million breeding birds in more than 100,000 chicken flocks, and about 2¼ million turkeys in 3,920 flocks. Tube and rapid serum testing is done in 82 pullorum testing laboratories. Approximately 88 percent of the whole-blood testing is performed by 4,000 pullorum testing agents in the States.

A reduction in the percentage of reactors on first test of hatching-egg supply flocks is one way of measuring progress. The percentage in 1936 of reactors among 4,329,363 chickens in 9,119 flocks was 3.66; in the year ended June 30, 1951, it had declined to 0.54 among 36,843,630 birds in 100,471 flocks. Similar progress has been made with turkeys: the percentage declined from 2.0 in 1944 to 0.36 in 1951.

A more satisfactory but less measurable indication of progress is the livability of the chicks and poults produced under the control programs. Surveys covering 8,389,572 chicks in eight States in 1951 show a mortality for the first 2 or 3 weeks from all causes of 198,841 chicks, representing an average livability of 97.64 percent. Comparable figures are not available for turkey poults. In reviewing laboratory records, we note a diagnosis of pullorum disease in chicks and poults which is traceable to infected parent flocks under the control program. This may indicate reinfection of the flock, or it may mean a lack of diligence in the testing program.

We may anticipate, on a nation-wide basis, a further reduction in the incidence of reactors and possibly a slight increase in average livability. There should be closer cooperation between the testing program and the diagnostic and research laboratories. The true pullorum status of flocks can only be determined by the laboratory upon consideration of the flock history, the character of the reactions, and the cultural examination of representative reactors.

The incidence of infection by *S. pullorum* variants should not be overlooked. The findings of Snoeyenbos and associates in 1951, revealing an incidence of 29.6 percent variant forms in 1,679 cultures from 27 States, emphasizes the desirability of post-mortem bacteriological examination of representative reactors and the typing of all pullorum isolates so that flocks may be tested with properly constituted antigens.

Fowl Typhoid

The incidence of fowl typhoid is apparently increasing, particularly in turkey flocks. Because of full cross-agglutination between *S. pullorum* and *S. gallinarum*, control of fowl typhoid is never entirely divorced from that of pullorum disease. Many chronic carriers of *S. gallinarum* are being eliminated from hatching-egg flocks as pullorum reactors, although the extent of such removal is unknown since only a relatively small percentage of reactors are submitted to laboratories for further diagnosis. There are, however, no organized programs for the control and eradication of fowl typhoid and no provisions in the pullorum control plan which restrict the setting of eggs from infected flocks.

Minimum control measures could be adopted by identifying infected flocks by cultural and serologic methods, by eradication of the disease through the liquidation of such flocks, and/or by abandoning infected flocks as a source of hatching eggs or destroying eggs prior to hatching.

Paratyphoid Infections

We have become increasingly aware of other avian salmonelloses, commonly referred to as the paratyphoid infections. Primarily a problem in turkey flocks, there are numerous reports of their incidence in chicken flocks. The control of paratyphoid infections present a real challenge.

There is nothing to be gained by individual breeders or by State disease control officials in concealing information that certain flocks may harbor paratyphoid carriers, since such flocks are a potential source of infection. We can intelligently plan control measures only when the incidence of the disease is known.

California and Minnesota notably have initiated paratyphoid testing programs in conjunction with the pullorum testing of turkey breeding flocks. The programs could more properly be referred to as typhimurium control programs since the diagnostic antigens used are primarily produced from strains of *S. typhimurium*.

On the limitations of a paratyphoid testing program, McNeil and Hinshaw emphasize that the primary object of a testing program should be detection of infected flocks and not merely the condemnation of all birds whose serums produce a reaction.

Admittedly, the nation-wide control of paratyphoid infections and fowl typhoid is difficult. When infections occur in breeding flocks, it is not simply the misfortune and responsibility of the owner but the earnest responsibility of the veterinary profession as well.

Poultry Meat Inspection

PHR brief

Although efforts are being made toward wider application and enforcement of sanitation requirements relative to poultry and poultry products, great difficulties are still to be overcome before a satisfactory service can be established. In addition to the need for laws covering both interstate and intrastate activities, the shortage of qualified inspectors is one of the most difficult problems.

Create a New Profession

The creation of a new profession of meat inspectors is one possible approach to this problem. Training for the new profession would include all courses in the veterinary curriculum except therapeutics and clinical and preveterinary training. It might include, in addition, training in general food inspection and sanitation. The course would be on a college level and would probably require 3 or 4 years.

This approach has certain advantages. The course would be at least 2 years shorter and con-

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sequently less expensive than a course in veterinary medicine. People so trained would qualify only for work in meat, milk, or food inspection and would therefore be apt to make such work their occupation for life.

On the other hand, there are possible disadvantages. The creation of a new profession might discourage fully trained veterinarians, who would still be needed in some positions, from entering the meat inspection field. It brings up the question of a possible demand for starting other "professions," such as poultry disease specialists, "trouble shooters" for feed companies, or sterility experts. Shall we then have a real veterinary profession composed of well-trained men who have a broad understanding of the entire field of animal diseases, or must we dismember it? Would the members of the new profession be recognized as properly qualified food inspectors by the Army and the Air Force? If so, would members of the new profession replace veterinarians or would there be places for both?

Stimulate Interest in Meat Inspection

An alternative solution is to find some way of supplying a sufficient number of veterinary inspectors. There is no immediate prospect of being able to do so, but within the next few years the chances are very good that with the expected increase in veterinary graduates an increasing number of veterinarians will seek employment in the meat inspection field.

With this in mind, veterinary colleges should make efforts to stimulate interest in meat inspection. Professional veterinary meat inspectors should be included on the faculties as part-time lecturers. Students should be given opportunities to serve as paid "interns" in packing plants during the summer between their junior and senior years. Arrangements should be made to allow senior veterinary students to serve as "food inspectors" in the meat laboratory in the college. The value of meat inspection to agricultural economics and public health should receive special attention.

There are, obviously, no prospects of being able to employ only veterinarians in meat inspection, nor is such a situation desirable. Certainly, technicians or veterinary associates can be trained to perform routine tasks. There must, however, be enough veterinary inspectors to serve as supervisors of all branches of meat inspection service.

Four Hospitals Will Close

Patient admissions to four general Public Health Service hospitals were discontinued in August and September. The hospitals are located in Kirkwood, Mo., Mobile, Ala., Portland, Maine, and San Juan, P. R. They are presently converting their facilities to out-patient clinics as provision is made for patient care elsewhere.

A reduction in Veterans Administration funds which would have provided contract care for veterans hospitalized in Public Health Service facilities led to the recommended closing of the four hospitals. They were selected because their patient load included more veterans and fewer Public Health Service beneficiaries than any remaining Public Health Service facilities. The number of Veterans Administration patients cared for by the Public Health Service will be reduced from 650 to 375.